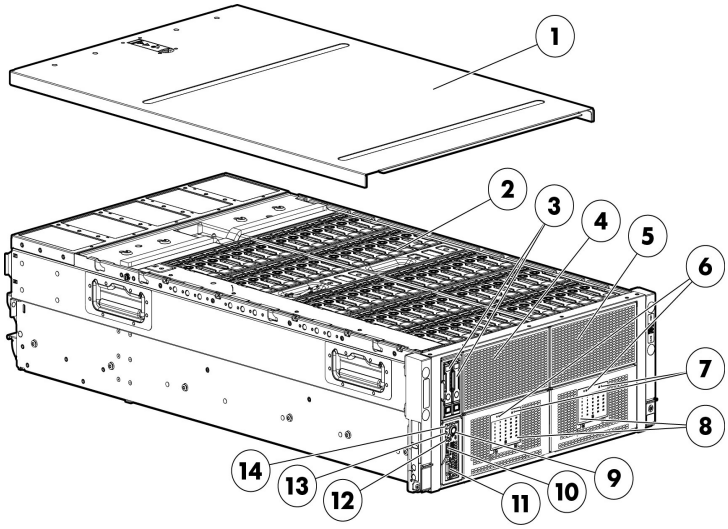
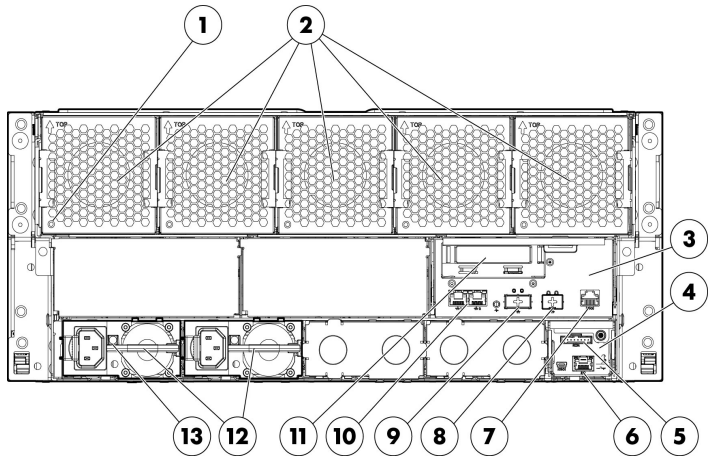
Overview

How are you going to scale out to petabytes with your current infrastructure?

Big data, largely unstructured such as messages, images, readings from sensors, and GPS signals from cell phones, are growing at an exponential rate. The HP ProLiant SL4540 Gen8 Server solves the traditional structured database problems when dealing with big data. Implementing a scale-out infrastructure will invariably result in challenges of data center capacity, spiraling energy costs, infrastructure complexity and inefficiencies because today's siloed infrastructure is not optimized for scale-out server workloads driven by big data. The SL4540 Gen8 Server is a server purpose-built for big data. A highly efficient converged design that delivers the right combination of capacity and performance, in the least amount of space and at lower cost, with the reliability and manageability you expect from HP ProLiant Gen8, the world's most intelligent servers.

SL4540 Gen8 1x60 Model





SL4540 Gen8 1x60 Model Front View:

1. Hood Cover
2. LFF 3.5" hard drives (60)
3. SFF 2.5" hard drives on node (2)
4. LFF hard drives connected to storage controller (Port 1i)
5. LFF hard drives connected to storage controller (Port 2i)
6. Hard drive backplane health LED
7. Storage UID
8. Hard drive LED display boards
9. Node ejection button
10. Node USB connectors (2)
11. Node video connector (VGA port)

SL4540 Gen8 1x60 Model Rear View:

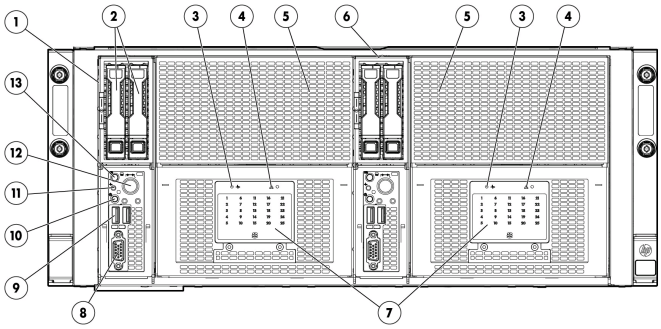
1. Fan LED
2. System fans
3. I/O Module
4. Management Module
5. SL Advanced Power Manager Distribution Module (SL-APMD)connector
6. iLO connector
7. Server Serial Port
8. 10Gb Ethernet SFP+ port
   NOTE: Available only when 10G I/O module is ordered. 1G I/O Module has 2x1Gb Ethernet ports only.
9. 10Gb Ethernet QSFP port
   NOTE: Available only when 10G I/O module is ordered. 1G I/O Module has 2x1Gb Ethernet ports only.
10. 2 X 1Gb Ethernet ports
11. Low profile PCI express slot
    NOTE: Available only when the optional HP SL454x Storage Mezzanine to PCIe Enablement Kit is ordered

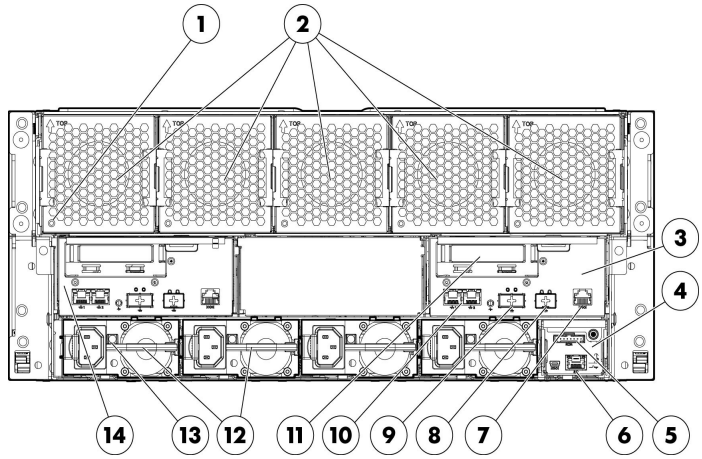
Overview

12. Node power ON/Standby button and system power LED
13. Node health LED
14. Node UID LED button

12. Power supplies
13. Power supply LED

SL4540 Gen8 2x25 model





SL4540 Gen8 2x25 Model Front View:

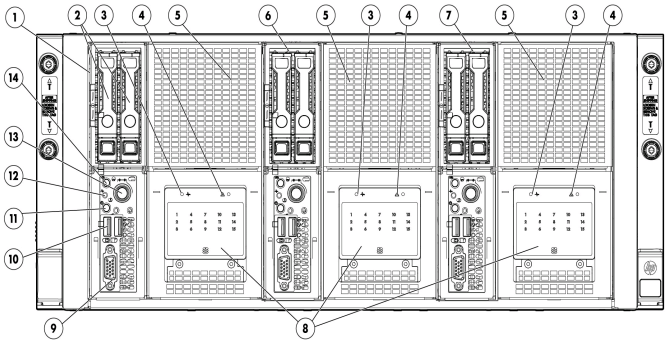
1. Server Node 1
2. SFF 2.5" hard drives on node (2)
3. Hard drive backplane health LED
4. Storage UID
5. LFF hard drives
6. Server Node 2
7. Hard drive LED display boards
8. Node video connector (VGA port)
9. Node USB connectors (2)
10. Node power ON/Standby button and system power LED
11. Node health LED
12. Node ejection button
13. Node UID LED button

SL4540 Gen8 2x25 Model Rear View:

1. Fan LED
2. System fans
3. I/O Module Server Node 1
4. Management Module
5. SL Advanced Power Manager Distribution Module (SL-APMD) connector
6. iLO connector
7. Server Serial Port
8. 10Gb Ethernet SFP+ port
   NOTE: Available only when 10G I/O module is ordered. 1G I/O Module has 2x1Gb Ethernet ports only.
9. 10Gb Ethernet QSFP port
   NOTE: Available only when 10G I/O module is ordered. 1G I/O Module has 2x1Gb Ethernet ports only.
10. 2 X 1Gb Ethernet ports
11. Low profile PCI express slot
    NOTE: Available only when the optional HP SL454x Storage Mezzanine to PCIe Enablement Kit is ordered
12. Power supplies
13. Power supply LED
14. I/O Module Server Node 2

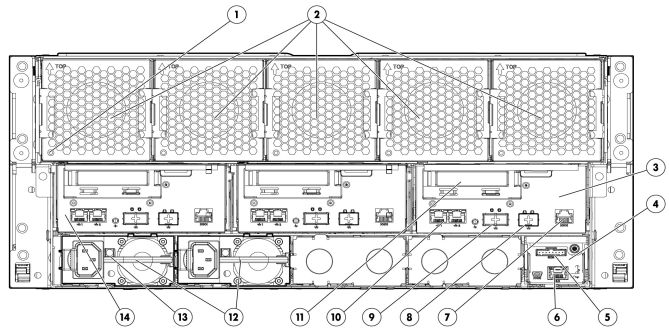
SL4540 Gen8 3x15 model

Overview



SL4540 Gen8 3x15 Model Front View:

1. Server Node 1
2. SFF 2.5" hard drives on node (2)
3. Hard drive backplane health LED
4. Storage UID
5. LFF hard drives connected to Server Node 1 (15)
6. Server Node 2
7. LFF hard drives connected to Server Node 2 (15)
8. Server Node 3
9. LFF hard drives connected to Server Node 3 (15)
10. Hard drive LED display boards
11. Node video connector (VGA port)
12. Node USB connectors (2)
13. Node power ON/Standby button and system power LED
14. Node health LED
15. Node ejection button
16. Node UID LED button



SL4540 Gen8 3x15 Model Rear View:

1. Fan LED
2. System fans
3. I/O Module Server Node 1
4. Management Module
5. SL Advanced Power Manager Distribution Module (SL-APMD) connector
6. iLO connector
7. Serial Port
8. 10Gb Ethernet SFP+ port
   NOTE: Available only when 10G I/O module is ordered. 1G I/O Module has 2x1Gb Ethernet ports only.
9. 10Gb Ethernet QSFP port
   NOTE: Available only when 10G I/O module is ordered. 1G I/O Module has 2x1Gb Ethernet ports only.
10. 2 X 1Gb Ethernet ports
11. Low profile PCI express slot
    NOTE: Available only when the optional HP SL454x Storage Mezzanine to PCIe Enablement Kit is ordered
12. Power supplies
13. Power supply LED
14. I/O Module Server Node 3

What's New

- Updating supported options.

Standard Features

NOTE: For the Standard Features shipped in the Factory Integrated Models, please see the "Configuration Information - Factory Integrated Models" section.

Processor One model of the following per server node	**Eight-Core Processors** Intel® Xeon® E5-2450 (2.1GHz/8-core/20MB/8GT-s QPI/95W, DDR3-1600, HT, Turbo2- 5/5/6/6/7/7/8/8) Turbo+ Intel® Xeon® E5-2470 (2.30GHz/8-core/20MB/8GT-s QPI/95W, DDR3-1600, HT, Turbo2- 5/5/6/6/7/7/8/8) **Six-Core Processors** Intel® Xeon® E5-2420 (1.9GHz/6-core/15MB/7.2GT-s QPI/95W, DDR3-1333, HT, Turbo2- 3/3/4/4/5/5)Turbo Intel® Xeon® E5-2430 (2.2GHz/6-core/15MB/7.2GT-s QPI/95W, DDR3-1333, HT, Turbo2- 3/3/4/4/5/5) Intel® Xeon® E5-2430L (2.0GHz/6-core/15MB/7.2GT-s QPI/60W, DDR3-1333, HT, Turbo2- 3/3/4/4/5/5) Intel® Xeon® E5-2440 (2.40GHz/6-core/15MB/7.2GT-s QPI/95W, DDR3-1333, HT, Turbo2- 3/3/4/4/5/5) **Quad-Core Processors** Intel® Xeon® E5-2407 (2.2GHz/4-core/10MB/6.4GT-s QPI/80W, DDR3-1066) **NOTE:** HT indicates that the processor model supports Intel® /Hyper-Threading Technology **NOTE:** Turbo 2 indicates the maximum potential bin increments when using Intel® Turbo Boost Technology, with 8, 7, 6, 5, 4, 3, 2 and 1 cores active or with 6, 5, 4, 3, 2 and 1 as applicable. **NOTE:** DDR3 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed (options for 1333 and 1066MHz memory speed are available). **NOTE:** Up to 2 processors supported. Mixing different processor models is not supported. **NOTE:** For the Intel® C600 Chipset E5-2400 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 2400x v#, 2 = number of CPUs in a Node, 4 is socket/segment designation, 00 = Processor SKU, x = L for low power SKUs and v# (not yet designated) = version number
Cache Memory One of the following depending on model	20MB (1x20MB) Level3 **NOTE:** For Eight-core processors. 15MB (1x15MB) Level3 **NOTE:** For Six-core processors. 10MB (1x10MB) Level3 **NOTE:** For Quad-core processors.
Chipset	Intel® C600 Series Chipset Intel® E5-2400 Processor Family **NOTE:** For more information regarding Intel® chipsets, please see the following URL: http://www.intel.com/products/server/chipsets/.
Upgradeability	Upgradeable to two processors

Standard Features

On System Management Processor	HP iLO (Firmware: HP iLO 4) **NOTE:** For more information, visit: http://www.hp.com/go/ilo.
Memory Protection	Advanced ECC (multi-bit error protection) Online Spare Lock Step Mode
Memory Dedicated to each server node	Type: HP SmartMemory DDR3 Registered (RDIMM) DIMM Slots Available: 12 DIMM Slots available Maximum (RDIMM) (per server tray): 192GB (12 x 16GB) Registered memory configurations **NOTE:** HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen8. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html **NOTE:** HP certified SmartMemory must be used to guarantee full 1333MHz speeds. **NOTE:** Depending on the memory configuration and processor model, the memory speed may run at 1333MHz or 1066MHz. Please see the Online Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator.
Network Controller One of the following dedicated to each server node	HP Ethernet 1Gb 2-port 361i HP Ethernet 1Gb 2-port 361i and HP Ethernet 10Gb 2P 544i Adapter **NOTE:** Dual port ConnectX-3 10GbE or QDR IB **NOTE:** Network controller is hosted in the I/O Module

Expansion Slots

Primary Riser Dedicated to each server node	Expansion Slots #	Technology	Bus Width*	Connector Width	Form Factor	Notes
	1	PCIe 2.0	X8	X8	Low profile slot	

*Indicates the number of physical electrical lanes running to the connector.

NOTE: One PCIe 2.0 low profile expansion slot is enabled by HP Svr Storage Mezz to PCIe Option Kit 682632-B21 for adding one of the expansion options including an HP IO accelerator, networking options or external storage controller options.

NOTE: Expansion Slot is hosted in the I/O Module.

Standard Features

HP Server ROM

HP ROM (Read Only Memory) is now digitally signed using HP's Corporate Signing Service. This signature is verified before the flash process starts, reducing accidental programming and preventing malicious efforts to corrupt system ROM.

HP ROM provides for essential initialization and validation of hardware components before control is passed to the customer-installed operating system. The ROM also provides the capability of booting from various fixed media (HDD, CD-ROM) and removable media (USB), to continue operation to the operating system.

HP ROM performs very early configuration of the video controller, to allow monitoring of initialization progress via an attached monitor. If configuration or hardware errors are discovered during this early phase of hardware initialization, suitable messages are now displayed on the connected monitor. Additionally, these configuration or hardware errors are logged to the Integrated Management Log (IML) to assist in diagnosis.

HP's ProLiant ROM is used to configure the following:

- Processor and chipset status registers
- System memory, memory map, and memory initialization
- System hardware configuration (Integrated PCI devices and optional PCIe cards).
- Customer-specific BIOS configuration (using the HP ROM-Based Setup Utility (RBSU).

NOTE: For further information, please refer to HP's RBSU (ROM based setup utility) user guide: www.hp.com/support/rbsu.

Storage Controllers
Dedicated to each server node

HP Dynamic Smart Array B120i SATA RAID

NOTE: HP Dynamic Smart Array B120i SATA RAID is located on the server node and controls only the two small form factor (SFF/2.5") hard drives on the server node itself.

HP Smart Array P420i Controller

NOTE: HP Smart Array P420i is located in the I/O Module, which is located at the rear of the SL4540 chassis and controls the large form factor (LFF/ 3.5") hard drives.

Internal Storage Devices

Diskette Drive	Via USB port, external support only
Optical Drive	Via USB port, external support only
Hard Drives	None ship standard
Drive Bays	2 SFF drive bays total for each node
	60 LFF drive bays total in chassis for a 1x60 model
	50 LFF drive bays total in chassis for a 2x25 model
	45 LFF drive bays total in chassis for a 3x15 model

Standard Features

Maximum Internal Storage

1x60 Model - 60 LFF Drives per node

Hot Plug LFF SAS	240.0TB	60 x 4TB
Hot Plug LFF SATA	240.0TB	60 x 4TB
Hot Plug SFF SATA	2.0TB	2 x 1TB
Hot Plug LFF SATA SSD	48.0TB	60 x 800GB
Hot Plug SFF SATA SSD	1.6TB	2 x 800GB

NOTE: The node consists of two SFF (2.5") hard drive bays on the front of the server

NOTE: The main storage section in the chassis has 60 LFF (3.5") hard drive bays and they can be populated with any combination of SAS, SATA, or SATA SSD drives to achieve desired performance.

2x25 Model - 25 LFF Drives per node

Hot Plug LFF SAS	200.0TB	50 x 4TB
Hot Plug LFF SATA	200.0TB	50 x 4TB
Hot Plug SFF SATA	4.0TB	4 x 1TB
Hot Plug LFF SATA SSD	40.0TB	50 x 800GB
Hot Plug SFF SATA SSD	3.2TB	4 x 800GB

NOTE: Each node contains two SFF (2.5") hard drive bays on the front of the node.

NOTE: The main storage section in the chassis has 50 LFF (3.5") hard drive bays, 25 bays per node, and they can be populated with any combination of SAS, SATA, or SATA SSD drives to achieve desired performance

3x15 Model - 15 LFF Drives per node, 45 LFF Drives per chassis

Hot Plug LFF SAS	180.0TB	45x 4TB
Hot Plug LFF SATA	180.0TB	45 x 4TB
Hot Plug SFF SATA	6.0TB	6 x 1TB
Hot Plug LFF SATA SSD	36.0TB	45 x 800GB
Hot Plug SFF SATA SSD	4.8TB	6 x 800GB

NOTE: Each node contains two SFF (2.5") hard drive bays on the front of the node.

NOTE: The main storage section in the chassis has 45 LFF (3.5") hard drive bays, 15 bays per node, and they can be populated with any combination of SAS, SATA, or SATA SSD drives to achieve desired performance.

Standard Features

Interfaces Dedicated to each server node	Network RJ-45	Two 1GbE NIC ports (available in both 1GbE and 10GbE I/O Module) **NOTE:** Only one of either the 1GbE I/O Module or 10GbE I/O Module can be connected to the node.
	SFP+ connector	One 10GbE SFP+ connector **NOTE:** 10GbE SFP+ and 10GbE/40Gb IB QSFP are additional networking interfaces available using optional 10GbE I/O Module.
	QSFP connector	One 10GbE/40GbIB QSFP connector **NOTE:** 10 Gb Ethernet on the QSFP port requires the use of the QSFP to SFP+ adapter 655874-B21 **NOTE:** IB supported with addition of HP IB Enablement Kit
	USB	2 front (external)
	Serial	1 rear (external on I/O Module)
	Video	1 front (external)
	Management Network Port	10/100 Mb Dedicated (Optionally a 1GbE port can be dedicated to iLO) **NOTE:** Management port is shared
	Health LED	2 front
	Power	1 front
	UID for node	1 front per node and 1 rear on management module)
	UID for storage	1 per display board

Industry Standard Compliance	ACPI 2.0b Compliant PCIe 2.0 Compliant WOL Support Microsoft® Logo certifications PXE Support USB 1.1 and 2.0 Compliant SMBIOS 2.6.1

Server Power Cords	6' Highline (IEC-IEC) power cord ships standard **NOTE:** HP ProLiant SL servers are primarily connected to PDU's in data center racks so they ship standard with only a PDU power cord (416151-B21). If a user wishes to power a ProLiant SL server using a 110V receptacle (NEMA-15), the NEMA power cord must be ordered separately. **NOTE:** If customers require a power cord, they can check the power cord matrix for the appropriate cord. Please see the following power cord matrix: http://www.hp.com/go/powercordmatrix.

Power Specifications	To review typical system power ratings use the HP Power Advisor which is available via the online tool located at URL: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor. **NOTE:** Power Specification and Technical Content for supported power supplies can be found at: http://h18000.www1.hp.com/products/quickspecs/14209_na/14209_na.html

Standard Features

Common Slot Power Supply	HP's Common Slot (CS) power supplies allow for commonality of power supplies across a wide range of ProLiant and Integrity servers, as well as HP Storage solutions, and are designed to provide the highest power supply efficiency without degrading system performance. HP CS power supplies are tested by the Electric Power Research Institute (EPRI) and certified through the ECOS 80 Plus power supply program. HP CS power supply options provide efficiency ratings of up to 94% and are available in two power output options - 750W, and 1200W - allowing the user to "right-size" a power supply for their specific server configuration. All HP Common Slot power sources are UL, CE Mark Compliant, hot-plug and support redundant configurations. It is highly recommended that you use the HP Power Advisor in defining the "Right-Size" power supply for your needs. HP Power Advisor can be accessed at: www.hp.com/go/hppoweradvisor. **NOTE:** Mixing of power supplies in the same server is not supported. All power supplies must be of the same output and efficiency rating. If non-matched power supplies are inserted you will get errors and operation will fail. **NOTE:** The 80 PLUS program is a unique forum that unites electric utilities, the computer industry, and consumers in an effort to bring energy efficient technology solutions to the marketplace. 80 Plus independently tests power supply efficiency and publicly posts the results on www.80Plus.org. **NOTE:** Redundant Power: Optional redundant power supplies can be purchased through power supply option kits (see Power Supplies for part numbers).
System Fans	System ships standard with 5 Dual fan modules.
Operating Systems and Virtualization Software Support for ProLiant Servers	Microsoft Windows Server Canonical Ubuntu Red Hat Enterprise Linux (RHEL) SUSE Linux Enterprise Server (SLES) VMware **NOTE:** Only 64-bit versions of these operating systems are supported. **NOTE:** For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server including how to purchase from HP, please visit our OS Support Site at: http://www.hp.com/go/ossupport and our driver download page: http://www.hp.com/support/SL4540Gen8
Graphics (per node)	Integrated Matrox G200 video standard • 1280 x 1024 (32 bpp) • 1920 x 1200 (16 bpp)
Form Factor	4.3U form factor **NOTE:** Can be racked as either a 5U tall chassis or as three chassis in 13U

Standard Features

On System Management	HP iLO Management Engine	HP iLO Management Engine is a comprehensive set of embedded management features supporting the complete lifecycle of the server, from initial deployment, through ongoing management, to service alerting and remote support. HP iLO Management Engine comes standard on all HP ProLiant Gen8 servers. The HP iLO Management Engine portfolio includes:
		• **HP iLO:** The HP iLO (Integrated Lights-Out) management processor is the core foundation for the HP iLO Management Engine
		• **HP Agentless Management:** Provides built in server health monitoring and alerting capability without OS agents, that starts working the moment a power cord and an Ethernet cable are connected.
		• **HP Active Health System:** Always on, continuous monitoring for increased stability and shorter downtimes; 100% configuration history; Health and service alerts and easy export and upload to Service and Support.
		• **HP Intelligent Provisioning:** Lets customers provision and configure a single server without any separate media. No more SmartStart CDs or Smart Update Firmware DVD are needed.
		  ○ To start Intelligent Provisioning:
		  ▪ Press the F10 key during the ProLiant Gen8 server boot process (also known as power on self test or POST).
		  ▪ Please go to the Intelligent Provisioning website at www.hp.com/go/intelligentprovisioning for additional information and to view usage videos.
		  ▪ Use the Service Pack for ProLiant (SPP) at www.hp.com/go/spp to get firmware and software updates.
		• **HP iLO Mobile App:** Enables the ability to access, deploy, and manage your server anytime from anywhere from select smartphones and mobile devices. For additional information please visit: www.hp.com/go/ilo/mobileapp
		
		NOTE: For more information, visit: http://www.hp.com/go/ilo or HP iLO Management Engine technologies whitepaper

Standard Features

HP Insight Management	HP Service Pack for ProLiant	HP Service Pack for ProLiant (SPP) and HP Smart Update Manager (HP SUM) provide a comprehensive approach to firmware and system software maintenance. Together they provide better operating stability and ensure maximum uptime. The SPP will be updated at a predictable cadence, typically coinciding with new HP server hardware launches. By enabling firmware to be updated online and integrating firmware and system software updates in one operation, HP SUM and the SPP offer faster updates of individual servers and dramatically faster updates of entire BladeSystem enclosures. Further improving system uptime and stability is the fact that HP provides 12 months of support for each Service Pack for ProLiant release. The user experience around HP SUM and the SPP has been improved in several ways, starting with the web download. A single web page provides access to a single download containing both the latest version of HP SUM and the latest SPP. Optional smaller subsets with only specific types of servers or specific operating systems are offered to save on download time. The HP SUM application provides a straightforward, intuitive user interface that guides the user through the steps of discovery, analyses and update, providing comprehensive information on available updates, criticality and interdependencies. This information is also available in reports. By providing the option of multiple local or shared repositories which can be easily updated from hp.com, HP SUM provides the tools to optimize stability and consistency throughout the company. While HP SUM and the SPP recommend the combinations of firmware and system software that HP has found to be the best practice, the application gives customers the flexibility to set their own specific baseline. The Service Pack for ProLiant has been rigorously tested with specific attention for interaction between firmware, drivers and agents both within the server as well as in interaction with the BladeSystem enclosure components (Onboard Administrator and Virtual Connect). This testing ensures the highest quality as well as providing the input for HP SUM to deploy updates taking into account all interdepencies, when determining the correct updates and order of update deployment. **NOTE:** The Service Pack for ProLiant (which includes HP SUM) can be downloaded from www.hp.com/go/spp/download. More information can be found: http://www.hp.com/go/SmartUpdate, www.hp.com/go/spp and http://www.hp.com/go/hpsum
Security	Power-on password QuickLock, Network Server Mode Serial interface control Administrator's password iLO 4 (Integrated Lights-Out 4) has 12 customizable user accounts and SSL encryption iLO 4 can be disabled via a Global Setting iLO Advanced supports directory services integration	

Standard Features

Warranty

This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners resellers. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

NOTE: Server Warranty includes 1-Year Parts, 1-Year Labor, 1-Year Onsite support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have HP replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at:
http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html

Optional Features

HP Insight management	HP Insight Control	HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. For more information, see http://www.hp.com/go/insightcontrol. HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, see: http://www.hp.com/services/insight.
	HP iLO Advanced	HP Integrated Lights-Out Advanced License a product option, providing smart remote server management without compromise. iLO Advanced unlocks the full set of remote administration functionality for all HP ProLiant servers by activating the full Virtual Keyboard Video and Mouse remote console, multi-user collaboration, console record and replay, GUI-based and scripted virtual media and virtual folders, and enhanced security and power management functionality. For more information, see: http://www.hp.com/go/iloadvance
	HP iLO Scale-Out	The HP iLO Scale-Out license ideal for web/hosting/cloud service providers and High Performance Computing environments. This license is a specific subset of iLO Advanced functionality, provides fast remote access through Text Console via SSH, lower operational cost with Dynamic power capping, and faster time to resolution through Email-based Alerting and proactive notifications. With this newly designed HP iLO Scale-Out license HPC customers now have a server management package solely design and priced for their massive data environments. HP iLO Scale-Out is available on all HP ProLiant Gen8 SL and BL and DL 160 servers. For more information, see: http://www.hp.com/go/iLO/scale-out
	HP Matrix Operating Environment	The HP Matrix Operating Environment (Matrix OE) for ProLiant and Integrity servers is an integrated command center that helps you instantly adjust to dynamic business demands. This advanced infrastructure management software lets you reduce the cost of common data center tasks by up to 40 percent while keeping pace with your changing business. The HP Matrix OE includes the automated provisioning, optimization, and recovery management capabilities for HP CloudSystem Matrix, the ideal platform for private cloud and Infrastructure as a Service (IaaS). **NOTE:** For more information, visit: http://www.hp.com/go/matrixoe

Optional Features

High Performance Clusters	HP HPC Interconnects	High Performance Computing (HPC) interconnect technologies are available for this server. These high-speed InfiniBand and 10 Gigabit interconnects are fully supported by HP. http://www.hp.com/techservers/clusters/ucp/index.html
	HP Insight Cluster Management Utility	HP Insight Cluster Management Utility (CMU) is an HP-licensed and HP-supported suite of tools that are used for lifecycle management of hyperscale clusters of Linux ProLiant systems. CMU includes software for the centralized provisioning, management and monitoring of nodes. CMU makes the administration of clusters user friendly, efficient, and effective. http://www.hp.com/go/cmu
	HP HPC Linux Value Pack	HP HPC Linux Value Pack (Value Pack) is an HP-licensed and HP-supported option to HP Insight CMU, for the development and deployment of applications on HPC Cluster Platforms. Value Pack includes the Platform LSF workload scheduler and Platform Application Center, as well as the HP-MPI parallelization library.

HP Insight Online

HP Insight Online is a new addition to the HP Support Center for one stop, secure access to product and HP support information personalized to your IT environment. Insight Online can automatically display devices remotely monitored by HP Insight Remote Support. With Insight Online's easy navigation you can efficiently track your IT support contracts and device status from anywhere and at anytime. www.hp.com/go/insightonline

Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

For more information on Factory Express services for your specific server model please contact your sales representative or go to: http://www.hp.com/go/factory-express.

HP Simple Configurator

SCE is a guided self service tool to help sales and non technical people provide customers with initial configurations in 3 to 5 minutes. You may then send the configuration on for configuration help, or use in your existing ordering processes. If you require "custom" rack configuration or configuration for products not available in SCE, please contact HP's Customer Business Center or an Authorized Partner for assistance. http://www.hp.com/products/configurator

Service and Support

Service and Support

HP Technology Services for SL Server
Capitalizing on capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.
What HP SL Services can do for you
HP SL Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. This way, HP proposes services solutions that include more than just uplift of base warranty. HP Services helps deliver high levels of application availability through proactive service management and advanced technical response

HP Technology Services meets business challenges with recommended services HP support solutions enable customers to optimize technology operations, minimize risk and drive better business outcomes with easy-to-buy, easy-to-use scalable support recommendations for servers, storage, networking and software. Protect your business beyond warranty with HP Care Pack Services: HP Care Pack services provide total care and support expertise with committed response choices designed to meet your IT and business needs

Recommended Support Solution

Supports maintaining servers at optimum performance availability

HP ProLiant Server Hardware Installation
Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner
http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf

HP Installation and Startup for Insight Control Software / HP SIM
Provides for the deployment and basic configuration of HP Insight Control or HP SIM (Systems Insight Manager) on HP ProLiant ML and DL series servers or HP BladeSystem servers or HP ProLiant SL servers
http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA0-9972ENW.pdf

For a Hyperscale Environment, Datacenter Care is our most flexible and comprehensive support offering. HP works in partnership with our customers to provide end-to-end tailored support for your existing IT environments while aiding you on your converged cloud journey. It leverages the integrated technology, people, processes, and partner ecosystem of HP to deploy, help operate, and evolve your data centers on their journey from traditional data centers to converged cloud. With the ability to configure support tailored to your needs, we offer you flexibility that is cost effective. Datacenter Care is made from "building blocks" of services, each tested and delivered globally. These can be combined to deliver the services that you require, and are monitored and updated to change as your needs change. Start with the core building blocks of an assigned account service manager, enhanced call handling, proactive and reactive support, and add on other services that are tailored to your specific needs. Proactive and reactive support are configured to deliver the level of support needed by the different components in a data center, to meet both SLA and cost targets.

For SMB to Enterprise customers HP Technology Services meets business challenges with the right services solution:

Recommended Services

3-Year HP 24x7 4 hour response, Proactive Care Service*
This service gives you combined reactive and proactive support including rapid access to our Advanced Solution Center to manage and prevent problems and a Technical Support Specialist with a broad level of technical knowledge that will engage with additional technical expertise as needed from HP's vast

	global resources. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf **HP ProLiant Server Hardware Installation** Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf
Insight Remote Support	Provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. Learn more http://www.hp.com/go/insightremotesupport
HP Support Center	Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc HP's Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime. HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement. *HP' Support Center Mobile App is subject to local availability
Warranty / Service Coverage	For ProLiant servers and storage systems, the services cover HP-branded hardware options qualified for the server, purchased at the same time or afterward, internal to the enclosure, as well as external monitors up to 22" and tower UPS products; these items will be covered at the same service level and for the same coverage period as the server unless the maximum supported lifetime and/or the maximum usage limitation has been exceeded. Coverage of the UPS battery is not included; standard warranty terms and conditions apply. The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction. It does not apply to any exchange of Disk or SSD/Flash Drives that have not failed. SSD/Flash Drives that are specified by HP as consumable parts and/or that have exceeded maximum supported lifetime and/or the maximum usage limit as set forth in the manufacturer's operating manual or the technical data sheet are not eligible for the defective media retention service feature option.
For more information	To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: http://www.hp.com/services/proliant

Configuration Information - Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for information on configurable product offerings and requirements.
NOTE: Factory Integrated Models must start with a CTO Server.
NOTE: FIO indicates that this option is only available as a factory installable option.
NOTE: All Factory Integrated Models will be populated with sufficient hard drive blanks based on the number of initial hard drives ordered with the server.
NOTE: Rack chosen is required to have 1200mm to provide space for cable management arm at the rear of the chassis and host PDU in the rear of the rack

Step 1: Base Configuration (choose one of the following configurable models)

HP Chassis - 1x60 Model	HP ProLiant SL454x 1x Node Chassis **NOTE:** Standard 5 dual fan modules included along with chassis. **NOTE:** Supports 60 LFF drives. One node total	663600-B21
	HP ProLiant SL4545 G7 Tray 1x Node Server	664646-B21
HP Chassis - 2x25 Model	HP ProLiant SL454x 2x Node Chassis **NOTE:** Standard 5 dual fan modules included along with chassis. **NOTE:** Supports 50 LFF drives with up to 25 per node. Two nodes total	663600-B22
	HP ProLiant SL4545 G7 Tray 2x Node Server	664646-B22
HP Chassis - 3x15 Model	HP ProLiant SL454x 3x Node Chassis **NOTE:** Standard 5 dual fan modules included along with chassis. **NOTE:** Supports 45 LFF drives with up to 15 per node. Three nodes total	663600-B23
	HP ProLiant SL4545 G7 Tray 3x Node Server	664646-B23
HP Power Supplies	**NOTE:** Prior to making a power supply selection it is highly recommended that the HP Power Advisor is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at: www.hp.com/go/hppoweradvisor	
	HP Common Slot Platinum Plus Power Supply Kits **NOTE:** The following power supplies offer up to 94% efficiency.	
	HP 750W Common Slot Platinum Plus Hot Plug Power Supply Kit	656363-B21
	HP 1200W Common Slot Platinum Plus Hot Plug Power Supply Kit	656364-B21
	HP Common Slot Gold Power Supplies **NOTE:** The following power supplies offer up to 92% efficiency.	
	HP 750W Common Slot Gold Hot Plug Power Supply Kit	512327-B21
	NOTE: Kits contain optional power supply, an IEC power cable and PDU IEC cables.	
HP Rail Kits	**NOTE:** One Rail Kit is required for every chassis in a rack.	
	HP 4.3U Server Rail Kit	681254-B21
	HP 0.66U Spacer Blank Kit **NOTE:** A Spacer Blank kit may be ordered to make an even 5U (4.3U+0.66U) spacing in a rack. This would enable racking of up to 8 chassis in a 42U rack. It is also possible to rack up to 9 chassis in a 42U rack using an additional dense racking option kit. The Spacer Blank kit is not used when the dense racking option HP 13U FIO Rack Adapter Kit for 3x4.3U Chassis is used	681260-B21

Step 1A: Select Nodes

Configuration Information - Factory Integrated Models

HP Server Nodes - 1x60 model	HP ProLiant SL4540 Gen8 Tray 1x Node Server **NOTE:** Select quantity of one	664644-B21
HP Server Nodes - 2x25 model	HP ProLiant SL4540 Gen8 Tray 2x Node Server **NOTE:** Select quantity of two	664644-B22
HP Server Nodes - 3x15 model	HP ProLiant SL4540 Gen8 Tray 3x Node Server **NOTE:** Select quantity of three	664644-B23

Step 2: Choose Required Node Options (only one of the following from each list unless otherwise noted)

HP Processors	**NOTE:** If 2 processor servers are desired, select one xxxxx-L21 and one xxxxxx-B21for every processor option chosen per node	
	Eight-Core Processors **NOTE:** All support up to 1333MHz DDR3 memory speeds.	
	HP SL4540 Gen8 Intel® Xeon® E5-2450 (2.1GHz/8-core/20MB/95W) FIO Processor Kit	730777-L21
	HP SL4540 Gen8 Intel® Xeon® E5-2470 (2.3GHz/8-core/20MB/95W) FIO Processor Kit	684373-L21
	Six-Core Processors **NOTE:** All support up to 1333MHz DDR3 memory speeds.	
	HP SL4540 Gen8 Intel® Xeon® E5-2420 (1.9GHz/6-core/15MB/95W) FIO Processor Kit	728427-L21
	HP SL4540 Gen8 Intel® Xeon® E5-2430 (2.2GHz/6-core/15MB/95W) FIO Processor Kit	684379-L21
	HP SL4540 Gen8 Intel® Xeon® E5-2430L (2.0GHz/6-core/15MB/60W) FIO Processor Kit	686169-L21
	HP SL4540 Gen8 Intel® Xeon® E5-2440 (2.4GHz/6-core/15MB/95W) FIO Processor Kit	684376-L21
	Quad-Core Processors **NOTE:** All support up to 1333MHz DDR3 memory speeds.	
	HP SL4540 Gen8 Intel® Xeon® E5-2407 (2.2GHz/4-core/10MB/80W) FIO Processor Kit	686166-L21
HP Memory	**NOTE:** Please choose memory options for the first processor of each server node. Up to 6 DDR3 DIMM slots are dedicated per processor socket. **NOTE:** HP memory from previous generation servers are not qualified or warranted with this HP ProLiant Server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen8. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html **NOTE:** HP certified SmartMemory must be used to guarantee full 1333MHz speeds. **NOTE:** Depending on the memory configuration and processor model, the memory speed may run at 1333MHz or 1066MHz. Please see the Online Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator	
	Registered DIMMs (RDIMM)	
	HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647897-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647901-B21
	NOTE: A maximum of 12 DDR3 based memory slots are available on the node tray.	

Configuration Information - Factory Integrated Models

HP I/O Module	**NOTE**: At least one I/O module must be selected per node. The HP ProLiant SL454x 1G FIO Module Kit supports two (2) embedded 1Gb NICs. The HP SL454x 10G FIO Input Output Module Kit supports two (2) embedded 1Gb NICs and two (2) embedded 10Gb NICs with an optional InfiniBand upgrade. **NOTE:** 10 Gb Ethernet on the QSFP port requires the use of the QSFP to SFP+ (QSA) adapter 655874-B21. **NOTE:** IB supported with addition of HP IB Enablement Kit	
	HP SL454x 1G FIO Input Output Module Kit	664647-B21
	HP SL454x 10G Input Output Module Kit	664648-B21
	NOTE: Quantity of I/O module is 1 for every 1x60 model, 2 for every 2x25 model and 3 for every 3x15 model.	
HP Storage Controllers	**NOTE:** Each node can support up to two of the p420i Gen8 storage controllers to manage the LFF hard drives. **NOTE:** If two p420i Gen8 storage controllers are ordered, the HP SL454x Storage Mezzanine to PCIe Enablement Kit cannot be ordered	
	NOTE: A cache module must be selected. Zero Memory cache option is not supported. The 12 inch Supercap kit must be ordered.	
	HP Smart Array P420i Mezzanine Controller FIO Kit	692276-B21
	Optional Upgrades	
	HP 12in Super Capacity Option for Smart Array	668943-B21
	HP 1GB P-series Smart Array Flash Backed Write Cache	631679-B21
	HP 2GB P-series Smart Array Flash Backed Write Cache	631681-B21

Step 3: Choose Additional Factory Integratable Options (only one of the following from each list unless otherwise noted)

Rack Adapter	HP 13U FIO Rack Adapter Kit for 3X4.3U Chassis	681677-B21
	NOTE: Densely groups three SL4540 chassis into a 13U tall space. Order one per three chassis. The 0.66U spacer is not used when selecting this option.	

HP Insight Software	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Single Server FIO License	C6N36A
	HP Insight Control for BladeSystem including 1yr 24x7 Support Enclosure 8 Svr FIO Electronic License	C6N32ABE
	HP Insight Control for BladeSystem including 1yr 24x7 Support Enclosure 16Svr FIO Electronic License	C6N33ABE
	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle FIO Electronic License	C6N36ABE

Step 4: Choose Additional Options for Factory Integration

PCI Riser	HP SL454x Storage Mezzanine to PCIe Enablement Kit **NOTE:** Needed to enable Low Profile PCIe Slot in the I/O module. Required for ordering any additional PCI Express cards for adding one of the expansion options such as HP IO accelerator, networking options or external storage controller options **NOTE:** If two p420i Gen8 storage controllers are ordered, the HP SL454x Storage Mezzanine to PCIe Enablement Kit cannot be ordered	682632-B21

NOTE: For additional options, please refer to the "Core Options" and "Additional Options" section below.

Core Options

NOTE: Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

HP Processors

NOTE: Please choose Processor options for the second processor of each server node.

Eight-Core Processors

HP SL4540 Gen8 Intel® Xeon® E5-2450 (2.1GHz/8-core/20MB/95W) Processor Kit	730777-B21
HP SL4540 Gen8 Intel® Xeon® E5-2470 (2.3GHz/8-core/20MB/95W) Processor Kit	684373-B21

Six-Core Processors

HP SL4540 Gen8 Intel® Xeon® E5-2420 (1.9GHz/6-core/15MB/95W) Processor Kit	728427-B21
HP SL4540 Gen8 Intel® Xeon® E5-2430 (2.2GHz/6-core/15MB/95W) Processor Kit	684379-B21
HP SL4540 Gen8 Intel® Xeon® E5-2430L (2.0GHz/6-core/15MB/60W) Processor Kit	686169-B21
HP SL4540 Gen8 Intel® Xeon® E5-2440 (2.4GHz/6-core/15MB/95W) Processor Kit	684376-B21

Quad-Core Processors

HP SL4540 Gen8 Intel® Xeon® E5-2407 (2.2GHz/4-core/10MB/80W) Processor Kit	686166-B21

NOTE: DDR3 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

HP Memory

NOTE: Please choose memory options for the second processor of each node. Up to 6 DDR3 DIMM slots are dedicated per socket.
NOTE: HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen8. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html
NOTE: HP certified SmartMemory must be used to guarantee full 1333MHz speeds.
NOTE: Depending on the memory configuration and processor model, the memory speed may run at 1333MHz or 1066MHz. Please see the Online Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator.

Registered DIMMs (RDIMM)

HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647897-B21
HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647901-B21

HP Hard Drives

NOTE: For the 1x60 model, choose up to a total of 60 LFF 3.5" hard drives from the following options using any mix of SAS/SATA/SSD hard drives for desired performance and up to a total of 2 SFF 2.5" hard drives from the following options for OS, boot or additional storage purposes.
NOTE: For the 2x25 model, choose up to a total of 25 LFF 3.5" hard drives per server node from the following options using any mix of SAS/SATA/SSD hard drives for desired performance and up to a total of 2 SFF 2.5" hard drives per server node from the following options for OS, boot or additional storage purposes.
NOTE: For the 3x15 model, choose up to a total of 15 LFF 3.5" hard drives per server

node from the following options using any mix of SAS/SATA/SSD hard drives for desired performance and up to a total of 2 SFF 2.5" hard drives per server node from the following options for OS, boot or additional storage purposes.
NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components for the subsystem.
NOTE: Hard drives have either a one year or three year warranty.

SAS Hot Plug SmartDrive LFF (3.5-inch) Enterprise Drives	
HP 600GB 6G SAS 15K rpm LFF (3.5-inch) SC Enterprise 3yr Warranty Hard Drive	652620-B21
HP 450GB 6G SAS 15K rpm LFF (3.5-inch) SC Enterprise 3yr Warranty Hard Drive	652615-B21
SAS Hot Plug SmartDrive LFF (3.5-inch) Midline Drives	
HP 4TB 6G SAS 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	695510-B21
HP 3TB 6G SAS 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	652766-B21
HP 2TB 6G SAS 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	652757-B21
HP 1TB 6G SAS 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	652753-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html	
6G SATA Hot Plug with SmartDrive SFF (2.5-inch) Midline (MDL) Drives	
HP 1TB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	655710-B21
HP 500GB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	655708-B21
6G SATA Hot Plug with SmartDrive LFF (3.5-inch) Midline (MDL) Drives	
HP 4TB 6G SATA 7.2k rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	693687-B21
HP 3TB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	628061-B21
HP 2TB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	658079-B21
HP 1TB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	657750-B21
HP 500GB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	658071-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13021_na/13021_na.html	
6G SATA Value Endurance Hot Plug LFF (3.5-inch) Enterprise Value Solid State Drives	
HP 800GB 6G SATA Value Endurance LFF 3.5-in SC Enterprise Value 3yr Wty Solid State Drive	718189-B21
HP 600GB 6G SATA Value Endurance LFF 3.5-in SC Enterprise Boot 3yr Wty Solid State Drive	739900-B21
HP 480GB 6G SATA Value Endurance LFF 3.5-in SC Enterprise Value 3yr Wty Solid State Drive	718183-B21
HP 300GB 6G SATA Value Endurance LFF 3.5-in SC Enterprise Boot 3yr Wty Solid State Drive	739890-B21
HP 240GB 6G SATA Value Endurance LFF 3.5-in SC Enterprise Value 3yr Wty Solid State Drive	718177-B21
6G SATA ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives	

Core Options

	HP 800GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691868-B21
	HP 400GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691866-B21
	HP 200GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691864-B21
	HP 100GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691862-B21
	6G SATA ME Hot Plug SFF (3.5-inch) Enterprise Mainstream Solid State Drives	
	HP 800GB 6G SATA Mainstream Endurance LFF 3.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691860-B21
	HP 400GB 6G SATA Mainstream Endurance LFF 3.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691856-B21
	HP 200GB 6G SATA Mainstream Endurance LFF 3.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691854-B21
	HP 100GB 6G SATA Mainstream Endurance LFF 3.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691852-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14038_na/14038_na.html	
HP Networking	**Gigabit Ethernet Adapters**	
	HP NC365T 4-port Ethernet Server Adapter	593722-B21
	HP Ethernet 1Gb 4-port 331T Adapter	647594-B21
	10 Gigabit Ethernet adapters	
	HP Ethernet 10Gb 2-port 530SFP Adapter	652503-B21
	HP Ethernet 10Gb 2-port 530T Adapter	656596-B21
	HP Ethernet 10Gb 2-port 561T Adapter	716591-B21
	NOTE: Need to order HP SL454x Storage Mezzanine to PCIe Enablement Kit to enable the low profile PCIe slot. **NOTE:** These are additional expansion options and only one may be selected per server node. **NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/ProLiantNICs	
HP InfiniBand	HP InfiniBand Enablement Kit	614841-B21
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/13078_na/13078_na.html	

Core Options

HP Power Supplies

NOTE: Prior to making a power supply selection it is highly recommended that the HP Power Advisor is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at: www.hp.com/go/hppoweradvisor.

HP Common Slot Platinum Plus Power Supply Kits

NOTE: The following Power Supplies offer 94% efficiency with support for Intelligent Power Discovery

HP 750W Common Slot Platinum Plus Hot Plug Power Supply Kit	656363-B21
HP 1200W Common Slot Platinum Plus Hot Plug Power Supply Kit	656364-B21

HP Common Slot Gold Power Supplies

NOTE: The following power supplies offer up to 92% efficiency.

HP 750W Common Slot Gold Hot Plug Power Supply Kit	512327-B21

NOTE: Option Kits contain optional power supply, an IEC power cable and PDU IEC cables.

NOTE: Power Specification and Technical Content for supported power supplies can be found at:
http://h18000.www1.hp.com/products/quickspecs/14209_na/14209_na.html

Additional Options

HP SL Advanced Power Manager	The SL Advanced Power Manager is an optional rack level solution for the HP ProLiant SL4540 and SL4545 which enables server-level DC (or hardware) power on and off and server-level monitoring. In addition, the SL APM will automatically discover SL hardware components which are connected into the SL APM solution. The SL APM does not replace rack PDUs, but is designed to enable the utilization of basic, low cost, rack PDUs while providing the functionality of 'switched' PDUs (which provide hardware power on/off of individual servers by turning off the AC power to the power supplies of a given server). Because the SL servers share power supplies to optimize power efficiency, using 'switched' PDUs to turn off all the power supplies in the chassis will result in the loss of all server nodes in that chassis. The SL APM solves this by allowing server node-level hardware power on/off of the DC power to the individual server node motherboards.	
	HP SL Advanced Power Manager Kit	538084-B21
	HP SL Advanced Power Manager Distribution Module Kit	620002-B21
HP Insight Software	**HP Insight Control**	
	HP Insight Control including 1yr 24x7 Technical Support and Updates Electronic License	C6N28ABE
	HP Insight Control including 1yr 24x7 Technical Support and Updates Single Server License	C6N27A
	HP Insight Control Server Deployment including 1yr 24x7 Support Electronic License	T9082AAE
	HP Insight Control Server Deployment including 1yr 24x7 Support Single Server License	452151-B21
	HP Insight Control Server Provisioning Media Kit	BD883A
	HP Insight Management Media Kit	C6N31A
	NOTE: Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single activation key. **NOTE:** Customer will receive a license entitlement certificate. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service. **NOTE:** Licenses ship without media. The HP Insight Control Media Kit can be ordered separately, or can be downloaded at: http://www.hp.com/go/insightupdates. **NOTE:** For additional license options please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12631_na/12631_na.html	
	HP Integrated Lights-Out (iLO)	
	HP iLO Scale-Out	
	HP Integrated Lights-Out Scale-Out including 3yr 24x7 Tech Support and Updates Flex Qty E-LTU	BD776AAE
	HP Integrated Lights-Out Scale-Out 3yr 24x7 Tech Support and Updates Flex Quantity License	BD776A
	HP Integrated Lights-Out Scale-Out including 3yr 24x7 Tech Support and Updates Tracking License	BD777A
	HP Integrated Lights-Out Scale-Out including 1yr 24x7 Tech Support and Updates Flex Qty E-LTU	BD778AAE
	HP Integrated Lights-Out Scale-Out 1yr 24x7 Tech Support and Updates Flex Quantity License	BD778A

Additional Options

	HP Integrated Lights-Out Scale-Out including 1yr 24x7 Tech Support and Updates Tracking License	BD779A
	NOTE: Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single set of activation keys.	
	NOTE: For additional license options please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/13019_na/13019_na.html	
	HP Integrated Lights-Out (iLO) Advanced for ProLiant	
	HP iLO Advanced including 1yr 24x7 Technical Support and Updates Electronic License	E6U59ABE
	HP iLO Advanced including 3yr 24x7 Tech Support and Updates Electronic License	E6U64ABE
	HP iLO Advanced including 1yr 24x7 Technical Support and Updates Single Server License	512485-B21
	HP iLO Advanced for BladeSystem including 1yr 24x7 Support Eight Server License	512489-B21
	HP iLO Advanced 1 Server License with 3yr 24x7 Tech Support and Updates	BD505A
	NOTE: For additional license options please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/14276_na/14276_na.html **NOTE:** For more information, visit: http://www.hp.com/go/ilo.	
High Performance Clusters	**HP Cluster Management Utility**	
	HP Insight Cluster Management Utility 1yr 24x7 Flexible License	QL803B
	HP Insight Cluster Management Utility 3yr 24x7 Flexible License	BD476A
	NOTE: These part numbers can be used to purchase one certificate for multiple licenses and support with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key. Customer also will receive a support agreement.	
	HP Insight Cluster Management Utility Media	BD477A
	NOTE: For additional license kits please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/12612_na/12612_na.html	

Additional Options

HP I/O Accelerator Options	**Second Generation Accelerators**	
	HP 365GB Multi Level Cell G2 PCIe ioDrive2 for ProLiant Servers	673642-B21
	HP 785GB Multi Level Cell G2 PCIe ioDrive2 for ProLiant Servers	673644-B21
	NOTE: Need to order HP SL454x Storage Mezzanine to PCIe Enablement Kit to enable the low profile PCIe slot. **NOTE:** These are additional expansion options and only one may be selected per server node. **NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13587_na/13587_na.html	
HP PCIe Workload Accelerator Options	**Mainstream Endurance (ME) PCIe Workload Accelerators**	
	HP 1.4TB HH/HL Mainstream Endurance (ME) PCIe Workload Accelerator	729307-B21
	HP 700GB HH/HL Mainstream Endurance (ME) PCIe Workload Accelerator	729305-B21
	High Endurance (HE) PCIe Workload Accelerators	
	HP 700GB HH/HL High Endurance (HE) PCIe Workload Accelerator	708090-B21
	HP 350GB HH/HL High Endurance (HE) PCIe Workload Accelerator	708088-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14528_na/14528_na.html	
HP Security	HP Trusted Platform Module Option	488069-B21
	NOTE: The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline. For more information about TPM, including a white paper, go to: www.hp.com/go/TPM. **NOTE:** ProLiant OS pre-installed units will come with the partition required for TPM deployment. **NOTE:** The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.	

Additional Options

HP Storage Controllers	**SAS Controllers**	
	Smart Array P421 Controller	
	HP Smart Array P421/1GB FBWC 6Gb 2-ports Ext SAS Controller	631673-B21
	HP Smart Array P421/2GB FBWC 6Gb 2-ports Ext SAS Controller	631674-B21
	Optional Upgrades	
	HP 12in Super Capacity Option for Smart Array **NOTE:** The HP 12in Super Cap is a required option to implement a HP Smart Array Controller with Flash.	668943-B21
	HP 1GB P-series Smart Array Flash Backed Write Cache	631679-B21
	HP 2GB P-series Smart Array Flash Backed Write Cache	631681-B21
	NOTE: The HP 12in Super Cap is a required option to implement a HP Smart Array Controller with Flash. **NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14229_na/14229_na.html (Smart Array P421 Controller)	
	Host Bus Adapter	
	HP H221 Host Bus Adapter	650931-B21
	NOTE: Need to order HP SL454x Storage Mezzanine to PCIe Enablement Kit to enable the low profile PCIe slot. **NOTE:** These are additional expansion options and only one may be selected per server node. **NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18004.www1.hp.com/products/quickspecs/14337_na/14337_na.html (HBA 222)	

HP Power Cords	**NOTE:** HP ProLiant servers ships with an IEC-IEC power cord used for rack mounting with Power Distribution Units (PDUs).	
	HP C13 - C14 WW 250V 10A Gray 0.7m Jumper Cord	A0K03A
	HP C13 - C14 WW 250V 10A Gray 1.37m Jumper Cord	A0K04A
	HP C13 - C14 WW 250V 10Amp 2.0m Jumper Cord	A0K02A
	HP C13 - C14 WW 250V 10A Gray 3.0m Jumper Cord	A0K06A
	HP C13 - Nema 6-15P US 250V 15A JP 3.6m Power Cord	A0N33A
	HP C13 - Nema 5-15P US/CA 110V 10Amp 1.83m Power Cord	AF556A
	HP C13 - C14 WW 250V 10Amp Flint Gray 2.0m Jumper Cord	AF573A

Additional Options

HP Tape Backup	**NOTE:** For the complete range of tape drives, autoloaders, libraries and media see: http://www.hp.com/go/tape. For hardware and software compatibility of HP tape backup products see: http://www.hp.com/storage/SPOCK	
	HP StoreEver LTO-6 Ultrium 6250 Tape Drive in 1U Rack-mount Kit	C0L99A
	HP StoreEver LTO-6 Ultrium 6650 Internal Tape Drive	EH963A
	HP StoreEver LTO-6 Ultrium 6650 External Tape Drive	EH964A
	HP StoreEver LTO-6 Ultrium 6250 Internal Tape Drive	EH969A
	HP StoreEver LTO-6 Ultrium 6250 External Tape Drive	EH970A
HP Uninterruptible Power Systems	**HP Rack-mountable UPS**	
	HP R1500 G3 Uninterruptible Power Supply (UPS)	
	HP R1.5kVA G3 1U NA Uninterruptible Power System	AF469A
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/14059_na/14059_na.html	
	HP R/T3000 G2 Uninterruptible Power System (UPS)	
	HP R/T3000 G2 2U L530 Low Voltage NA/JP Uninterruptible Power System	AF466A
	HP R/T3000 G2 2U L620 High Voltage NA/JP Uninterruptible Power System	AF467A
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/14058_na/14058_na.html	
	R5000 Uninterruptible Power System (UPS)	
	HP R5KVA 3U L630 High Voltage NA/JP Uninterruptible Power System	AF460A
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/14109_na/14109_na.html	
	R7000 Uninterruptible Power System (UPS)	
	HP R7KVA 4U 50A High Voltage NA/JP Uninterruptible Power System	AF462A
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/14110_na/14110_na.html	
	NOTE: For additional information on HP Uninterruptible Power Systems please go to: www.hp.com/servers/rackups. **NOTE:** For additional information on sizing your server, please reference: http://www.upssizer.com. **NOTE:** Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link: www.hp.com/products/powercords.	

Additional Options

HP Basic Power Distribution Units	HP 1.9kVA 120 Volt 12 Outlet NA/JP Basic Power Distribution Unit	H5M54A
	HP 2.8kVA 120 Volt 18 Outlet NA/JP Basic Power Distribution Unit	H5M55A
	HP 3.6kVA 200-240 Volt 12 Outlet WW Basic Power Distribution Unit	H5M56A
	HP 3.6kVA 200-240 Volt 20 Outlet WW Basic Power Distribution Unit	H5M57A
	HP 4.9kVA 208 Volt 20 Outlet NA/JP Basic Power Distribution Unit	H5M58A
	HP 4.9kVA 208 Volt 30 Outlet NA/JP Basic Power Distribution Unit	H5M59A
	HP 8.3kVA 208 Volt 36 Outlet NA/JP Basic Power Distribution Unit	H5M60A
	HP 8.6kVA 208 Volt Three Phase 18 Outlet NA/JP Basic Power Distribution Unit	H5M61A
	HP 8.6kVA 208 Volt Three Phase 30 Outlet NA/JP Basic Power Distribution Unit	H5M62A
	HP 5.7kVA 208 Volt Three Phase 27 Outlet NA/JP Dual Voltage Basic Power Distribution Unit	H5M63A
	HP 8.6kVA 208 Volt Three Phase 30 Outlet NA/JP Dual Voltage Basic Power Distribution Unit	H5M64A
	HP 11kVA 400 Volt Three Phase 42 Outlet NA Basic Power Distribution Unit	H5M67A
	HP Hardwired 200-240 Volt 36 Outlet WW Basic Power Distribution Unit	H5M75A
	HP 13.2kVA 480 Volt Three Phase 15 Outlet NA Basic Power Distribution Unit	H3X07A
	HP 19.9kVA 480 Volt Three Phase 30 Outlet NA Basic Power Distribution Unit	H3X08A
	HP 277 Volt options for H3X07A and H3X08A	
	HP 800VA - 277V Input / 230V Output NA Rack Mount Transformer	H3X09A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14557_na/14557_na.html **NOTE:** Additional HP Power Distribution Units are available. For a complete list of all HP PDUs and additional information please visit: www.hp.com/go/rackandpower	
HP Remote Monitoring Power Distribution Units	HP 2.8kVA 120 Volt 12 Outlet NA/JP Monitored Power Distribution Unit	D9N43A
	HP 4.9kVA 208 Volt 12 Outlet NA/JP Monitored Power Distribution Unit	D9N44A
	HP 3.6kVA 200-240 Volt 16 Outlet WW Monitored Power Distribution Unit	D9N45A
	HP 3.6kVA 200-240 Volt 12 Outlet WW Monitored Power Distribution Unit	D9N46A
	HP 4.9kVA 208 Volt 24 Outlet NA/JP Monitored Power Distribution Unit	D9N47A
	HP 8.3kVA 208 Volt 33 Outlet NA Monitored Power Distribution Unit	D9N49A
	HP 8.6kVA 208 Volt Three Phase 21 Outlet NA/JP Monitored Power Distribution Unit	D9N51A
	HP 5.7kVA 208 Volt Three Phase 21 Outlet NA/JP Dual Voltage Monitored Power Distribution Unit	D9N52A
	HP 8.6kVA 208 Volt Three Phase 24 Outlet NA/JP Dual Voltage Monitored Power Distribution Unit	D9N53A
	HP 17.3kVA 208 Volt Three Phase 27 Outlet NA/JP Monitored Power Distribution Unit	D9N54A
	HP 14.4kVA 208 Volt Three Phase 24 Outlet NA Monitored Power Distribution Unit	D9N58A
	HP 17.3kVA 208 Volt Three Phase 24 Outlet NA/JP Monitored Power Distribution Unit	D9N59A
	HP 16.6kVA 400 Volt Three Phase 33 Outlet NA Monitored Power Distribution Unit	D9N61A
	HP 16.6kVA 400 Volt Three Phase 24 Outlet NA Monitored Power Distribution Unit	D9N62A
	HP 19.9kVA 480 Volt Three Phase 30 Outlet NA Monitored Power Distribution Unit	D9N63A

Additional Options

	HP Environmental Sensor for Remote Monitored PDUs	
	HP Environmental Sensor for Remote Monitored PDUs	E2D53A
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/14669_na/14669_na.html	
HP Intelligent Power Distribution Units (iPDU)	**iPDU Core Units**	
	HP 4.9kVA 24A Single Phase NA/JP Core Intelligent Modular Power Distribution Unit	AF520A
	HP 8.6kVA 24A Three Phase NA/JP Core Intelligent Modular Power Distribution Unit	AF522A
	iPDU Extension Bars	
	HP 5xC13 Intelligent PDU Extension Bar G2 Kit	AF547A
	HP 5xC13 Outlets Power and UID LEDs Pair Standard Extension Bar	AF528A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13650_na/13650_na.html	
HP Power Distribution Units	**Monitored PDUs**	
	HP Monitored Power Distribution Unit: Full Rack Version	
	HP 8.6kVA 24A Single Input Three Phase NA/JP Monitored Power Distribution Unit	AF504A
	HP 8.3kVA 40A Single Input Single Phase NA/JP Monitored Power Distribution Unit	AF506A
	HP Monitored Power Distribution Unit: Half Rack Version	
	HP 4.9kVA 24A Single Input Single Phase NA/JP Monitored Power Distribution Unit	AF914A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12118_na/12118_na.html	
	NOTE: For additional information on HP Power Distribution Units including accessories please go to: www.hp.com/go/pdu.	
	NOTE: Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link: www.hp.com/products/powercords.	
	NOTE: This PDU has a detachable input power cord and allows for adaptability to country specific power requirements.	
	NOTE: Please see the following QuickSpecs for additional options including shorter jumper cables and country specific power cords: http://h18000.www1.hp.com/products/quickspecs/11041_na/11041_na.html	

Additional Options

HP Rack Series	**HP Intelligent Rack Series**	
	HP 636 1200mm Pallet Intelligent Series Rack	BW899A
	HP 636 1200mm Shock Intelligent Series Rack	BW900A
	HP 642 1200mm Pallet Intelligent Series Rack	BW907A
	HP 642 1200mm Shock Intelligent Series Rack	BW908A
	HP 647 1200mm Pallet Intelligent Series Rack	BW913A
	HP 647 1200mm Shock Intelligent Series Rack	BW914A
	NOTE: Rack chosen is required to have a depth of 1200mm to provide space for cable management arm at the rear of the chassis and host PDU in the rear of the rack. **NOTE:** Please see the QuickSpecs for Technical Specifications such as height, width, depth, weight, and color: http://h18000.www1.hp.com/products/quickspecs/14223_na/14223_na.html **NOTE:** For additional information regarding Rack Cabinets, please see the following URL: http://www.hp.com/go/rackandpower.	
HP Rack Options	**HP TFT7600 G2 KVM Console and Monitor (TFT7600 G2)**	
	HP TFT7600 G2 KVM Console Rackmount Keyboard US Monitor	AZ870A
	HP TFT7600 G2 KVM Console Rackmount Keyboard US TAA Monitor	AZ885A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13731_na/13731_na.html	
	HP Server Console Switches	
	HP Server Console 0x2x8 Port Analog Switch	AF616A
	HP Server Console 0x2x16 Port Analog Switch	AF617A
	HP TAA 0x2x16xKVM Server Console G2 Switch	AF626A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11834_na/11834_na.html	
	HP Server Console Switch G2 with Virtual Media & CAC	
	HP 0x2x16 KVM Server Console Switch G2 with Virtual Media CAC Software	AF618A
	HP 0x2x32 KVM Server Console Switch G2 with Virtual Media CAC Software	AF619A
	HP KVM CAT5 1-pack USB Interface Adapter	336047-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13475_na/13475_na.html	
	HP IP Console Switch G2 with Virtual Media & CAC	
	HP 1x4 USB/PS2 KVM Console Switch	AF611A
	HP 1x1Ex8 KVM IP Console Switch G2 with Virtual Media CAC Software	AF620A
	HP 2x1Ex16 KVM IP Console Switch G2 with Virtual Media CAC Software	AF621A
	HP 4x1Ex32 KVM IP Console Switch G2 with Virtual Media CAC Software	AF622A

Additional Options

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/13474_na/13474_na.html

HP Care Pack Services	**Server Care Packs**	
	HP 3 year Next business day SL454X Gen8 Tray 1x Node Hardware Support	U7K40E
	HP 3 year Next business day Defective Media Retension SL454X Gen8 Tray 1x Node Hardware Support	U7K41E
	HP 3 year Next business day SL454X Gen8 Tray 1x Node Proactive Service	U7K42E
	HP 3 year Next business day Defective Media Retension SL454X Gen8 Tray 1x Node Proactive Service	U7K43E
	HP 3 year 4 hour 13x5 SL454X Gen8 Tray 1x Node Hardware Support	U7K44E
	HP 3 year 4 hour 13x5 with Defective Media Retension SL454X Gen8 Tray 1x Node Hardware Support	U7K45E
	HP 3 year 4 hour 24x7 SL454X Gen8 Tray 1x Node Hardware Support	U7K48E
	HP 3 year 4 hour 24x7 Defective Media Retension SL454X Gen8 Tray 1x Node Hardware Support	U7K49E
	HP 3 year 4 hour 24x7 SL454X Gen8 Tray 1x Node Proactive Service	U7K50E
	HP 3 year 4 hour 24x7 Defective Media Retension SL454X Gen8 Tray 1x Node Proactive Service	U7K51E
	HP 3 year 24 hour 24x7 Call to Repair SL454X Gen8 Tray 1x Node Hardware Support	U7K54E
	HP 3 year 24 hour 24x7 Defective Media Retension SL454X Gen8 Tray 1x Node Hardware Support	U7K55E
	HP 3 year 6 hour 24x7 Call to Repair SL454X Gen8 Tray 1x Node Hardware Support	U7K56E
	HP 3 year 6 hour 24x7 Defective Media Retension SL454X Gen8 Tray 1x Node Hardware Support	U7K57E
	HP 3 year 6 hour 24x7 SL454X Gen8 Tray 1x Node Call to Repair Proactive Service	U7K58E
	HP 3 year 6 hour 24x7 Defective Media Retension SL454X Gen8 Tray 1x Call to Repair Proactive Service	U7K59E
	Enclosure Care Packs	
	HP 3 year Next business day SL454x 1 Node Chassis Hardware Support	U7J55E
	HP 3 year Next business day Defective Media Retension SL454x 1 Node Chassis Hardware Support	U7J56E
	HP 3 year Next business day SL454x 1 Node Chassis Proactive Service	U7J57E
	HP 3 year Next business day Defective Media Retension SL454x 1 Node Chassis Proactive Service	U7J58E
	HP 3 year 4 hour 13x5 SL454x 1 Node Chassis Hardware Support	U7J59E
	HP 3 year 4 hour 13x5 with Defective Media Retension SL454x 1 Node Chassis Hardware Support	U7J60E
	HP 3 year 4 hour 24x7 SL454x 1 Node Chassis Hardware Support	U7J63E
	HP 3 year 4 hour 24x7 Defective Media Retension SL454x 1 Node Chassis Hardware Support	U7J64E
	HP 3 year 4 hour 24x7 SL454x 1 Node Chassis Proactive Service	U7J65E

Additional Options

HP 3 year 4 hour 24x7 Defective Media Retension SL454x 1 Node Chassis Proactive Service	U7J66E
HP 3 year 24 hour 24x7 Call to Repair SL454x 1 Node Chassis Hardware Support	U7J69E
HP 3 year 24 hour 24x7 Defective Media Retension SL454x 1 Node Chassis Hardware Support	U7J70E
HP 3 year 6 hour 24x7 Call to Repair SL454x 1 Node Chassis Hardware Support	U7J71E
HP 3 year6 hour 24x7 Defective Media Retension SL454x 1 Node Chassis Hardware Support	U7J72E
HP 3 year 6 hour 24x7 SL454x 1 Node Chassis Call to Repair Proactive Service	U7J73E
HP 3 year 6 hour24x7 Defective Media Retension SL454x1 Node Chassis Call to Repair Proactive Service	U7J74E

NOTE: For more information, customer/resellers can contact: http://www.hp.com/services/carepack.

Memory

HP ProLiant SL4540 (Gen8) server

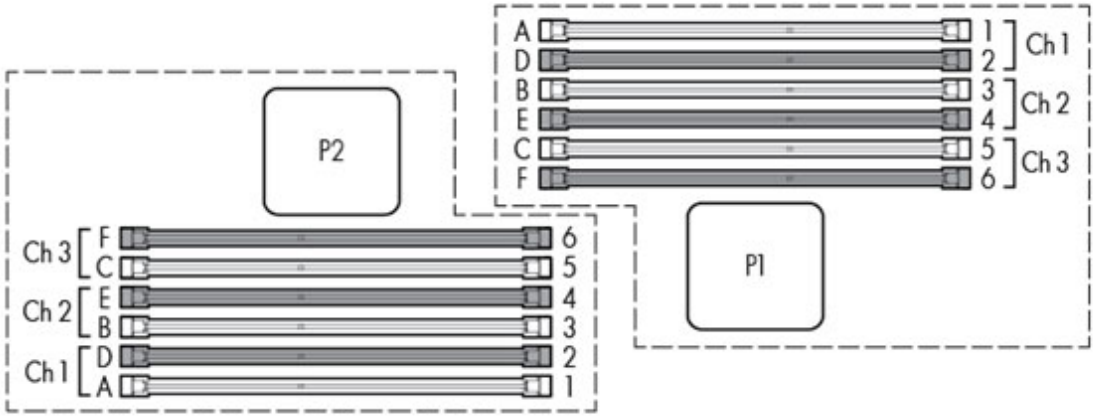
NOTE: Chart does not represent all possible memory configurations.

For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator

Memory Subsystem Architecture

Each Intel® Xeon® E5-2400 family processor socket contains three memory channels that support two DIMMs each for a total of six (6) DIMM per installed processor or a grand total of twelve (12) DIMMs for the server. Up to 16GB capacity DIMMs are supported for 192GB of memory (12 DIMM slots x 16GB per DIMM).

DIMM slot and configuration diagrams



Memory population guidelines

General Memory Population Rules and Guidelines:

- Light DIMM slots denote the first slot of a channel. For 1 DPC (DIMM per channel) populate light slots only.
- Install DIMMs only if the corresponding processor is installed.
- If only one processor is installed in a two processor system, only half of the DIMM slots are available.
- To maximize performance, it is recommended to balance the total memory capacity between all installed processors and to load the channels similarly whenever possible.
- Populate DIMMs from heaviest load (dual-rank) to lightest load (single-rank) within a channel. Heaviest load (DIMM with most ranks) within a channel goes furthest from the processor
- The maximum memory speed is a function of the memory type, memory configuration, and processor model.
- The maximum memory capacity is a function of the memory type and number of installed processors.
- HP memory from previous generation servers is not qualified on the SL4540 Gen8 Server. Certain HP SmartMemory features such as memory authentication and enhanced performance may not be supported.
- To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html.

Memory

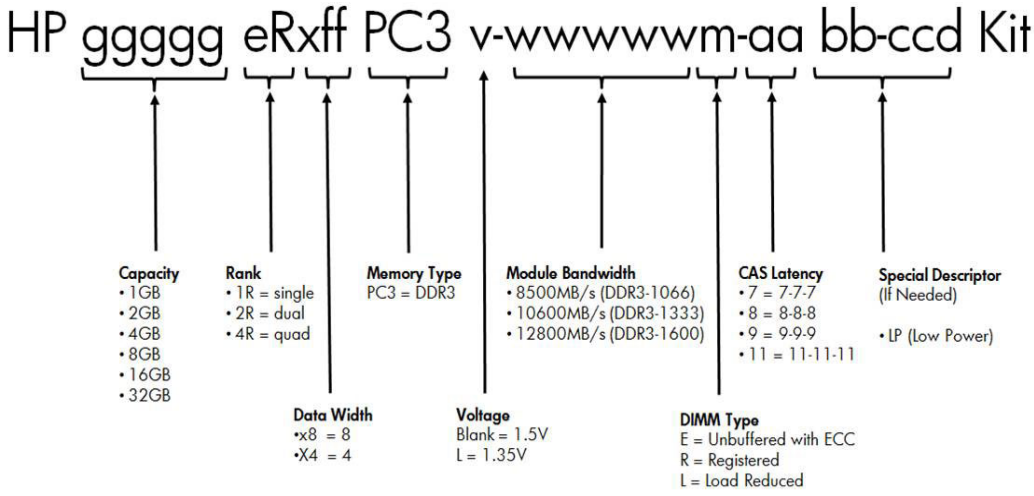
DIMM Type	Registered DIMMS (RDIMMs)		
DIMM Rank	**Single Rank (1R)**	**Dual Rank (2R)**	
DIMM Capacity	4GB	8GB	16GB
DIMM Native Speed (MHz)	1333	1333	1333
Voltage	LV	LV	LV
SLOTS THAT CAN BE POPULATED			
12 slot server nodes	12	12	12
MAXIMUM CAPACITY (GB)*	48	96	192
1 DIMM Per Channel	1333	1333	1333
2 DIMM Per Channel	1333	1333	1333

NOTE: Memory speed is a function of the processor QPI bus speed.
* Maximum capacity will vary based on individual server platform qualification schedule

NOTE: Capacity references are rounded to the common Gigabyte values:

- 4GB = 4096MB
- 8GB = 8192MB
- 16GB = 16384MB

DDR3 memory options part number decoder



Memory

Following are memory options available from HP:

HP Memory

NOTE: Please choose memory options for socket 2 of each server node. Up to 6DDR3 DIMM slots dedicated per socket.

NOTE: HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen8. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html

NOTE: HP certified SmartMemory must be used to guarantee full 1333MHz speeds.

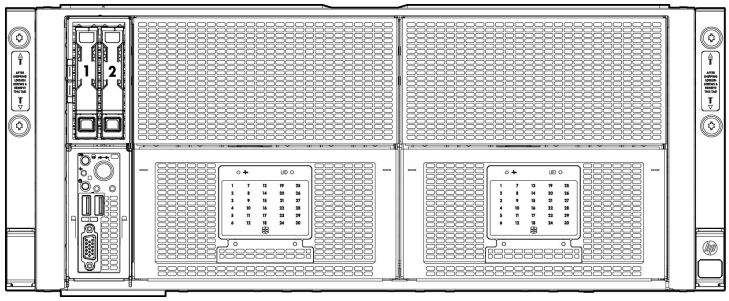
NOTE: Depending on the memory configuration and processor model, the memory speed may run at 1333MHz or 1066MHz. Please see the Online Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator.

Registered DIMMs (RDIMM)

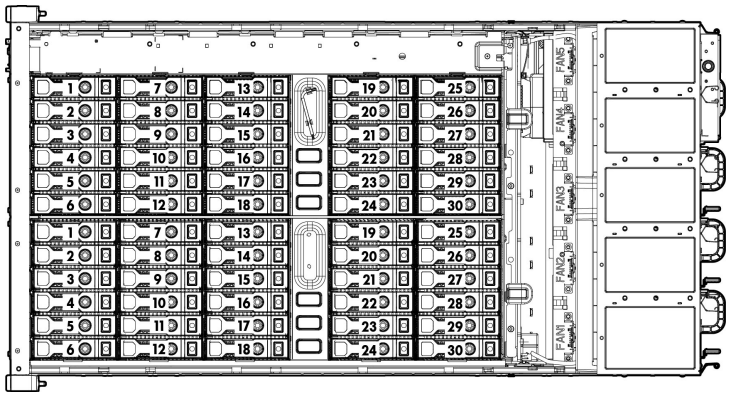
HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647897-B21
HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647901-B21

Storage

1x60 Model



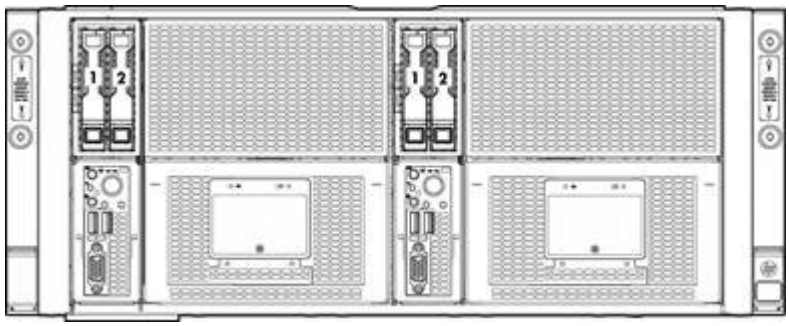
1-2 2 x SFF SATA/SATA SDD Hot Plug Hard Drive Bays



1-30 30 x LFF SATA/SAS/SDD Hot Plug Hard Drive Bays Controller Port 1i

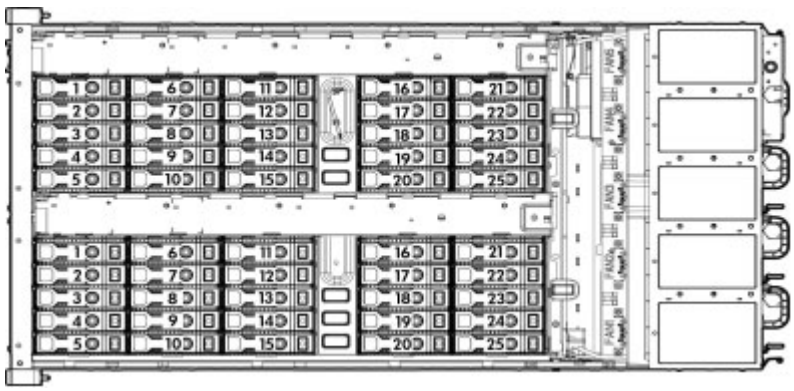
1-30 30 x LFF SATA/SAS/SDD Hot Plug Hard Drive Bays Controller Port 2i

2x25 Model



1-2 2 x SFF SATA/SATA SDD Hot Plug SFF Hard Drive Bays for server node 1

1-2 2 x SFF SATA/SATA SDD Hot Plug SFF Hard Drive Bays for server node 2

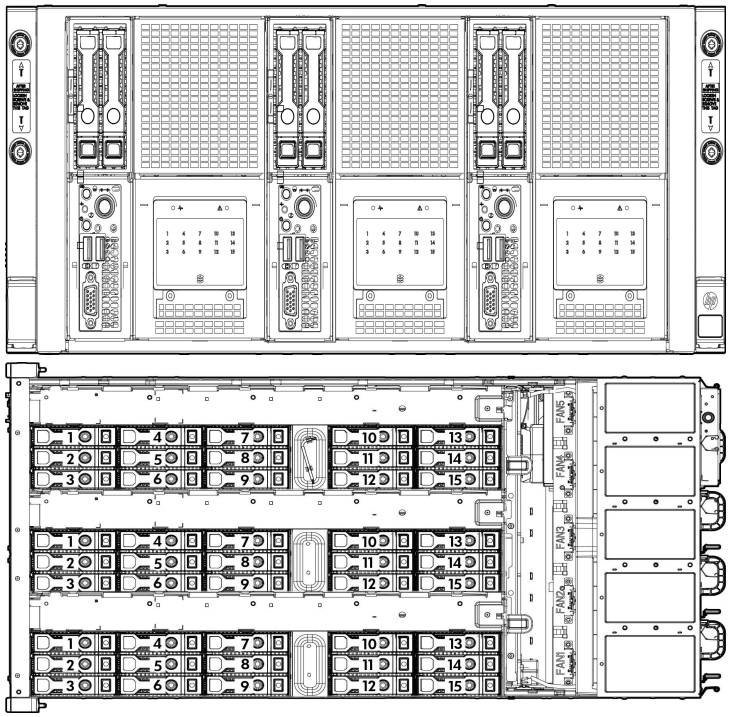


1-25 25 x LFF SATA/SAS/SDD Hot Plug Hard Drive Bays for server node 1

1-25 25 x LFF SATA/SAS/SDD Hot Plug Hard Drive Bays for server node 2

Storage

3x15 Model



1-2 2 x SFF SATA/SATA SDD Hot Plug SFF Hard Drive Bays for server node 1

1-2 2 x SFF SATA/SATA SDD Hot Plug SFF Hard Drive Bays for server node 2

1-2 2 x SFF SATA/SATA SDD Hot Plug SFF Hard Drive Bays for server node 3

1-15 15 x LFF SATA/SAS/SDD Hot Plug Hard Drive Bays for server node 1

1-15 15 x LFF SATA/SAS/SDD Hot Plug Hard Drive Bays for server node 2

1-15 15 x LFF SATA/SAS/SDD Hot Plug Hard Drive Bays for server node 3

Maximum Storage Capacity - 1x60 Model

Internal (2 SFF Drive Cage)	2TB (2 x 1TB SATA SFF)
Internal (60 LFF Drive Cage)	240TB (60 x 4TB SATA LFF)
Total	242TB

Maximum Storage Capacity - 2x25 Model

Internal (2 SFF Drive Cage)	4TB (4 x 1TB SATA SFF)
Internal (50 LFF Drive Cage)	200TB (50 x 4TB SATA LFF)
Total	204TB

Maximum Storage Capacity - 3x15 Model

Internal (2 SFF Drive Cage)	6TB (6 x 1TB SATA SFF)
Internal (50 LFF Drive Cage)	180TB (45 x 4TB SATA LFF)
Total	186TB

Technical Specifications

System Unit	**Chassis Dimensions** (H x W x D) Add fan extension kit (with bezel)	7.47 x 17.45 x 35.34in (18.96 x 44.33 x 89.97cm) **NOTE:** Rack chosen is required to have 1200mm depth to provide space for cable management arm at the rear of the chassis and host PDU in the rear of the rack.)	
	Weight (approximate)	Maximum (all hard drives, power supply, and processor installed)	220lb (99.8kg)
	Input Requirements (per power supply)	Rated Line Voltage	100 to 120 VAC 200 to 240 VAC
		Rated Input Current	For 1200 W Power Supply: 10 A (at 100 VAC), 4.9 A (at 200 VAC) For 750 W Power Supply: 8.9 A (at 100 VAC), 4.3 A (at 200 VAC)
		Rated Input Frequency	50 to 60 Hz
		Rated Input Power	For 1200 W Power Supply: 930 W (at 100 VAC), 1348 W (at 200 VAC) For 750 W Power Supply: 857 W (at 100 VAC), 824 W (at 200 VAC)
	Power Supply Output (per power supply)	Rated Steady-State Power	For 1200 W Power Supply: 800 W (at 100 VAC), 900 W (at 120 VAC), 1200 W (at 200 to 240 VAC)
		Maximum Peak Power	For 1200 W Power Supply: 800 W (at 100 VAC), 900 W (at 120 VAC), 1200 W (at 200 to 240 VAC) For 750 W Power Supply: 750 W (at 100 to 120 VAC), 750 W (at 200 to 240 VAC)
	Power Specifications	To review typical system power ratings use the HP Power Advisor which is available via the online tool located at URL: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor.	
	Power Supply Output (per power supply)	Rated Steady-State Power	
	System Inlet Temperature	Operating	50° to 95° F (10° to 35° C) at sea level with an altitude derating of 1.8°F per every 1000 ft (1.0°C per every 304.8 m) above sea level to a maximum of 10,000 ft (3048 m), no direct sustained sunlight. Maximum rate of change is 18°F/hr (10°C/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan

		fault or above 86°F (30°C).
	Non-operating	-22° to 140° F (-30° to 60° C) Maximum rate of change is 36°F/hr (20°C/hr).
Relative Humidity (non-condensing)	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
	Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
Altitude	Operating	10,000 ft (3048 m). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
	Non-operating	30,000 ft (9144 m). Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).	
	Idle	
	L WAd	7.27 B
	L pAm	58.93 dBA
	Operating	
	L WAd	7.27 B
	L pAm	59.00 dBA
Emissions Classification (EMC)	**FCC Rating**	Class A
	Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1

NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

Technical Specifications

HP Ethernet 1Gb 2-port 361i Adapter	**Network Interface**	10Base-T/100Base-TX/1000Base-TX	
	Compatibility	IEEE 802.3 10Base-T IEEE 802.3ab 1000Base-T IEEE 802.3u 100Base-TX IEEE 1588, IEEE 802.1AS IEEE 802.3az - Energy Efficient Ethernet (EEE)	
	Data Transfer Method	PCI Express v 2.1, 5.0 GT/s and 2.5 GT/s bus speeds and supports for x1, x2, x4 links widths (Lanes)	
	Controller	I350 Powerville	
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s per port, 20 Mb/s Combined
		10Base-T (Full-Duplex)	20 Mb/s per port, 40 Mb/S Combined
		100Base-TX (Half-Duplex)	100 Mb/s per port, 200 Mb/s Combined
		100Base-TX (Full-Duplex)	200 Mb/s per port, 400 Mb/s Combined
		1000Base-TX (Half and Full-Duplex)	1000Mb/s per port, 2000 Mb/s Combined
	Connector	RJ-45	
	Cable Support	10Base-T	Categories 3, 4 or 5 UTP; up to 328 ft (100 m)
		10/100/1000Base-TX	Category 5 UTP; up to 328 ft (100 m)

HP Ethernet 10Gb 2-port 544i SFP Adapter	**Data Transfer Method**	Compliant to x8 PCIe Gen2 Specification	
	Network Transfer Rate	X4 IB: 10 Gb/s (SDR), 20 Gb/s (DDR), 40Gb/s (QDR) 10Gb/s Ethernet: Full-duplex single lane XFI	
	Connector	QSFP - IB SFP+ - 10Gb/s Ethernet.	
	Cable Support	IB: HP copper and optical IB cables. 10Gb/s: HP copper and optical SFP+ cables	**NOTE:** IB supported with addition of HP IB Enablement Kit

Technical Specifications

HP Smart Array P420i Controller	**Dimensions**	Embedded
	Disk Drive and Enclosure Interface - Transfer rate	6Gb/s SAS (Serial Attached SCSI) 6Gb/s SATA (Serial ATA)
	SAS Connectors	2 internal 4X connectors
	Cache Memory Speed	1GB or 2GB FBWC DDR3-1333MHz with 72-bit wide bus
	Server Interface	x8 PCIe 3.0 operating at PCI 2.0
	SAS Speed	(8) 6Gb/s SAS links provide 4.8GB/s maximum bandwidth
	Cache Memory	72-bit 1GB FBWC or 72-bit 2GB FBWC
	Logical Drives Supported	Up to 64 logical drives with cache
	Host Memory Addressing	64-bit, supporting greater than 4GB server memory space
	RAID Support	RAID 6, 60 (Advanced Data Guarding) RAID 5, 50 (Distributed Data Guarding) **NOTE:** A minimum of 512 MB cache is required to enable RAID 5, 50, 6, 60 **NOTE:** HP Smart Array Advanced Pack (SAAP 2.0) is no longer required to enable RAID 6 & 60 (Advanced Data Guarding). However, controller must be in firmware version 4.68 (or later). RAID 1+0 (Striping & Mirroring) RAID 0 (Striping), RAID 1 (Mirroring)
Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.